



## **Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility**

In the mid-1990's, the USPTO sought to clarify the legal requirements for statutory subject matter with regard to computer-related inventions. See Examination Guidelines for Computer Related Inventions, 61 Fed. Reg. 7478 (1996). Subsequent to the publication of those guidelines, the Court of Appeals for the Federal Circuit issued opinions in State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998) and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999). These decisions explained that, to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. Since this time, the USPTO has seen increasing numbers of applications outside the realm of computer-related inventions that raise subject matter eligibility issues. In order to assist examiners in identifying and resolving these issues, the USPTO is issuing these interim examination guidelines to assist USPTO personnel in the examination of patent applications to determine whether the subject matter as claimed is eligible for patent protection.

The principal objective of these guidelines is to assist examiners in determining, on a case-by-case basis, whether a claimed invention falls within a judicial exception to statutory subject matter (i.e., is nothing more than an abstract idea, law of nature, or natural phenomenon), or whether it is a practical application of a judicial exception

to statutory subject matter. The guidelines explain that a practical application of a 35 U.S.C. § 101 judicial exception is claimed if the claimed invention physically transforms an article or physical object to a different state or thing, or if the claimed invention otherwise produces a useful, concrete, and tangible result.

## **I. INTRODUCTION**

These Examination Guidelines (“Guidelines”) are based on the USPTO’s current understanding of the law and are believed to be fully consistent with binding precedent of the Supreme Court, the Federal Circuit and the Federal Circuit’s predecessor courts.

These Guidelines do not constitute substantive rulemaking and hence do not have the force and effect of law. These Guidelines have been designed to assist USPTO personnel in analyzing claimed subject matter for compliance with substantive law. Rejections will be based upon the substantive law and it is these rejections which are appealable. Consequently, any failure by USPTO personnel to follow the Guidelines is neither appealable nor petitionable.

The Guidelines set forth the procedures USPTO personnel will follow when examining applications. USPTO personnel are to rely on these Guidelines in the event of any inconsistent treatment of issues between these Guidelines and any earlier provided guidance from the USPTO.

Inquiries concerning these Interim Guidelines may be directed to Linda Therkorn, Office of the Deputy Commissioner for Patent Examination Policy, by

telephone at 571-272-8800, or Ray Chen, Office of the Solicitor, by telephone at 571-272-9035.

Annex I which appears at the end of this section includes a flow chart of the process USPTO personnel should follow.

## **II. DETERMINE WHAT APPLICANT HAS INVENTED AND IS SEEKING TO PATENT**

It is essential that patent applicants obtain a prompt yet complete examination of their applications. Under the principles of compact prosecution, each claim should be reviewed for compliance with every statutory requirement for patentability in the initial review of the application, even if one or more claims are found to be deficient with respect to some statutory requirement. Thus, USPTO personnel should state all reasons and bases for rejecting claims in the first Office action. Deficiencies should be explained clearly, particularly when they serve as a basis for a rejection. Whenever practicable, USPTO personnel should indicate how rejections may be overcome and how problems may be resolved. A failure to follow this approach can lead to unnecessary delays in the prosecution of the application.

Prior to focusing on specific statutory requirements, USPTO personnel must begin examination by determining what, precisely, the applicant has invented and is seeking to patent, and how the claims relate to and define that invention. (As the courts have repeatedly reminded the USPTO: “The goal is to answer the question ‘What did applicants invent?’” In re Abele, 684 F.2d 902, 907, 214 USPQ 682, 687. Accord, e.g., Arrhythmia Research Tech. v. Corazonix Corp., 958 F.2d 1053, 1059,

22 USPQ2d 1033, 1038 (Fed. Cir. 1992).) USPTO personnel will review the complete specification, including the detailed description of the invention, any specific embodiments that have been disclosed, the claims and any specific, substantial, and credible utilities that have been asserted for the invention. After obtaining an understanding of what applicant invented, the examiner will conduct a search of the prior art and determine whether the invention as claimed complies with all statutory requirements.

**A. Identify and Understand Any Utility and/or Practical Application Asserted for the Invention**

The claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a “useful, concrete and tangible result.” State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of “real world” value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966)); In re Fisher, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

The applicant is in the best position to explain why an invention is believed useful. Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful. Such a statement will usually explain the purpose of the invention or how the invention may be used (e.g., a compound is believed to be useful

in the treatment of a particular disorder). Regardless of the form of statement of utility, it must enable one ordinarily skilled in the art to understand why the applicant believes the claimed invention is useful. See MPEP § 2107 for utility examination guidelines. An applicant may assert more than one utility and practical application, but only one is necessary.

**B. Review the Detailed Disclosure and Specific Embodiments of the Invention To Understand What the Applicant Has Invented**

The written description will provide the clearest explanation of the applicant's invention, by exemplifying the invention, explaining how it relates to the prior art and explaining the relative significance of various features of the invention. Accordingly, USPTO personnel should continue their evaluation by

(1) determining the function of the invention, that is what the invention does when used as disclosed (e.g., the functionality of the programmed computer) (*Arrhythmia*, 958 F.2d at 1057, 22 USPQ at 1036, “It is of course true that a modern digital computer manipulates data, usually in binary form, by performing mathematical operations, such as addition, subtraction, multiplication, division, or bit shifting, on the data. But this is only how the computer does what it does. Of importance is the significance of the data and their manipulation in the real world, i.e., what the computer is doing.”); and

(2) determining the features necessary to accomplish at least one asserted practical application.

Patent applicants can assist the USPTO by preparing applications that clearly set forth these aspects of an invention.

### **C. Review the Claims**

The claims define the property rights provided by a patent, and thus require careful scrutiny. The goal of claim analysis is to identify the boundaries of the protection sought by the applicant and to understand how the claims relate to and define what the applicant has indicated is the invention. USPTO personnel must first determine the scope of a claim by thoroughly analyzing the language of the claim before determining if the claim complies with each statutory requirement for patentability. See In re Hiniker Co., 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998) (“[T]he name of the game is the claim.”).

USPTO personnel should begin claim analysis by identifying and evaluating each claim limitation. For processes, the claim limitations will define steps or acts to be performed. For products, the claim limitations will define discrete physical structures or materials. Product claims are claims that are directed to either machines, manufactures or compositions of matter.

USPTO personnel are to correlate each claim limitation to all portions of the disclosure that describe the claim limitation. This is to be done in all cases whether or not the claimed invention is defined using means or step plus function language. The correlation step will ensure that USPTO personnel correctly interpret each claim limitation.

The subject matter of a properly construed claim is defined by the terms that limit its scope. It is this subject matter that must be examined. As a general matter, the grammar and intended meaning of terms used in a claim will dictate whether the language limits the claim scope. Language that suggests or makes optional but does

not require steps to be performed or does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation. The following are examples of language that may raise a question as to the limiting effect of the language in a claim:

- (A) statements of intended use or field of use,
- (B) “adapted to” or “adapted for” clauses,
- (C) “wherein” clauses, or
- (D) “whereby” clauses.

This list of examples is not intended to be exhaustive. See also MPEP § 2111.04. USPTO personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted “in view of the specification” without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (“During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.”).

Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim. Toro Co. v. White Consolidated Industries Inc., 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999) (meaning of words used in a claim is not construed in a “lexicographic vacuum, but in the context of the specification and drawings.”). Any special meaning assigned to a term “must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention.” Multiform Desiccants Inc. v. Medzam Ltd., 133 F.3d 1473, 1477, 45 USPQ2d 1429, 1432 (Fed. Cir. 1998). See also MPEP § 2111.01. If the applicant asserts that a term has a meaning that conflicts with the term’s art-accepted meaning, USPTO personnel should encourage the applicant to amend the claim to better reflect what applicant intends to claim as the invention. If the application becomes a patent, it becomes prior art against subsequent applications. Therefore, it is important for later search purposes to have the patentee employ commonly accepted terminology, particularly for searching text-searchable databases.

USPTO personnel must always remember to use the perspective of one of ordinary skill in the art. Claims and disclosures are not to be evaluated in a vacuum. If elements of an invention are well known in the art, the applicant does not have to provide a disclosure that describes those elements. Where means plus function language is used to define the characteristics of a machine or manufacture invention, claim limitations must be interpreted to read on only the structures or materials disclosed in the specification and “equivalents thereof.” Two en banc decisions of the Federal Circuit have made clear that the USPTO is to interpret means plus function

language according to 35 U.S.C. § 112, sixth paragraph. In re Donaldson, 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1848 (Fed. Cir. 1994) (in banc); In re Alappat, 33 F.3d 1526, 1540, 31 USPQ2d 1545, 1554 (Fed. Cir. 1994) (in banc).

Disclosure may be express, implicit or inherent. Thus, at the outset, USPTO personnel must attempt to correlate claimed means to elements set forth in the written description. The written description includes the original specification and the drawings. USPTO personnel are to give the claimed means plus function limitations their broadest reasonable interpretation consistent with all corresponding structures or materials described in the specification and their equivalents including the manner in which the claimed functions are performed. See Kemco Sales, Inc. v. Control Papers Company, Inc., 208 F.3d 1352, 54 USPQ2d 1308 (Fed. Cir. 2000). Further guidance in interpreting the scope of equivalents is provided in MPEP § 2181 through § 2186. While it is appropriate to use the specification to determine what applicant intends a term to mean, a positive limitation from the specification cannot be read into a claim that does not impose that limitation. A broad interpretation of a claim by USPTO personnel will reduce the possibility that the claim, when issued, will be interpreted more broadly than is justified or intended. An applicant can always amend a claim during prosecution to better reflect the intended scope of the claim.

Finally, when evaluating the scope of a claim, every limitation in the claim must be considered. USPTO personnel may not dissect a claimed invention into discrete elements and then evaluate the elements in isolation. Instead, the claim as a whole must be considered. See, e.g., Diamond v. Diehr, 450 U.S. 175, 188-89, 209 USPQ 1, 9 (1981) (“In determining the eligibility of respondents’ claimed process for patent

protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis. This is particularly true in a process claim because a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made.”).

### **III. CONDUCT A THOROUGH SEARCH OF THE PRIOR ART**

Prior to evaluating the claimed invention under 35 U.S.C. § 101, USPTO personnel are expected to conduct a thorough search of the prior art. Generally, a thorough search involves reviewing both U.S. and foreign patents and nonpatent literature. In many cases, the result of such a search will contribute to USPTO personnel’s understanding of the invention. Both claimed and unclaimed aspects of the invention described in the specification should be searched if there is a reasonable expectation that the unclaimed aspects may be later claimed. A search must take into account any structure or material described in the specification and its equivalents which correspond to the claimed means plus function limitation, in accordance with 35 U.S.C. § 112, sixth paragraph and MPEP § 2181 through § 2186.

**IV. DETERMINE WHETHER THE CLAIMED INVENTION COMPLIES  
WITH THE SUBJECT MATTER ELIGIBILITY REQUIREMENT OF  
35 U.S.C. § 101**

**A. Consider the Breadth of 35 U.S.C. § 101 Under Controlling Law**

Section 101 of title 35, United States Code, provides:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

As the Supreme Court held, Congress chose the expansive language of 35 U.S.C. § 101 so as to include “anything under the sun that is made by man.” Diamond v. Chakrabarty, 447 U.S. 303, 308-09, 206 USPQ 193, 197 (1980).

In Chakrabarty, 447 U.S. at 308-309, 206 USPQ at 197, the court stated:

In choosing such expansive terms as “manufacture” and “composition of matter,” modified by the comprehensive “any,” Congress plainly contemplated that the patent laws would be given wide scope. The relevant legislative history also supports a broad construction. The Patent Act of 1793, authored by Thomas Jefferson, defined statutory subject matter as “any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement [thereof].” Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318. The Act embodied Jefferson’s philosophy that “ingenuity should receive a liberal encouragement.” V Writings of Thomas Jefferson, at 75-76. See Graham v.

John Deere Co., 383 U.S. 1, 7-10 (148 USPQ 459, 462-464) (1966).

Subsequent patent statutes in 1836, 1870, and 1874 employed this same broad language. In 1952, when the patent laws were recodified, Congress replaced the word “art” with “process,” but otherwise left Jefferson’s language intact. The Committee Reports accompanying the 1952 Act inform us that Congress intended statutory subject matter to “include anything under the sun that is made by man.” S. Rep. No. 1979, 82d Cong., 2d Sess., 5 (1952); H.R. Rep. No. 1923, 82d Cong., 2d Sess., 6 (1952). [Footnote omitted]

This perspective has been embraced by the Federal Circuit:

The plain and unambiguous meaning of section 101 is that any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if it meets the requirements for patentability set forth in Title 35, such as those found in sections 102, 103, and 112. The use of the expansive term “any” in section 101 represents Congress’s intent not to place any restrictions on the subject matter for which a patent may be obtained beyond those specifically recited in section 101 and the other parts of Title 35.... Thus, it is improper to read into section 101 limitations as to the subject matter that may be patented where the legislative history does not indicate that Congress clearly intended such limitations.

Alappat, 33 F.3d at 1542, 31 USPQ2d at 1556.

35 U.S.C. § 101 defines four categories of inventions that Congress deemed to be the appropriate subject matter of a patent: processes, machines, manufactures and compositions of matter. The latter three categories define “things” or “products”

while the first category defines “actions” (i.e., inventions that consist of a series of steps or acts to be performed). See 35 U.S.C. 100(b) (“The term ‘process’ means process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.”).

Federal courts have held that 35 U.S.C. § 101 does have certain limits. First, the phrase “anything under the sun that is made by man” is limited by the text of 35 U.S.C. § 101, meaning that one may only patent something that is a machine, manufacture, composition of matter or a process. See, e.g., Alappat, 33 F.3d at 1542, 31 USPQ2d at 1556; In re Warmerdam, 33 F.3d 1354, 1358, 31 USPQ2d 1754, 1757 (Fed. Cir. 1994). Second, 35 U.S.C. § 101 requires that the subject matter sought to be patented be a “useful” invention. Accordingly, a complete definition of the scope of 35 U.S.C. § 101, reflecting Congressional intent, is that any new and useful process, machine, manufacture or composition of matter under the sun that is made by man is the proper subject matter of a patent.

The subject matter courts have found to be outside of, or exceptions to, the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena. While this is easily stated, determining whether an applicant is seeking to patent an abstract idea, a law of nature or a natural phenomenon has proven to be challenging. These three exclusions recognize that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable. See, e.g., Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874) (“idea of itself is not patentable, but a new device by which it may be made practically useful is”); Mackay Radio & Telegraph Co. v. Radio Corp. of America,

306 U.S. 86, 94, 40 USPQ 199, 202 (1939) (“While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.”); Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759 (“steps of ‘locating’ a medial axis, and ‘creating’ a bubble hierarchy . . . describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic ‘abstract idea’”).

The courts have also held that a claim may not preempt ideas, laws of nature or natural phenomena. The concern over preemption was expressed as early as 1852. See Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1852) (“A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.”); Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 132, 76 USPQ 280, 282 (1948) (combination of six species of bacteria held to be nonstatutory subject matter). Accordingly, one may not patent every “substantial practical application” of an idea, law of nature or natural phenomena because such a patent “in practical effect be a patent on the [idea, law of nature or natural phenomena] itself.” Gottschalk v. Benson, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972).

**B. Determine Whether the Claimed Invention Falls Within An Enumerated Statutory Category**

To properly determine whether a claimed invention complies with the statutory invention requirements of 35 U.S.C. § 101, USPTO personnel must first identify whether the claim falls within at least one of the four enumerated categories of

patentable subject matter recited in section 101 (process, machine, manufacture or composition of matter).

In many instances it is clear within which of the enumerated categories a claimed invention falls. Even if the characterization of the claimed invention is not clear, this is usually not an issue that will preclude making an accurate and correct assessment with respect to the section 101 analysis. The scope of 35 U.S.C. § 101 is the same regardless of the form or category of invention in which a particular claim is drafted. AT&T, 172 F.3d at 1357, 50 USPQ2d at 1451 . See also State Street, 149 F.3d at 1375, 47 USPQ2d at 1602 wherein the Federal Circuit explained

The question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to -- process, machine, manufacture, or composition of matter -- [provided the subject matter falls into at least one category of statutory subject matter] but rather on the essential characteristics of the subject matter, in particular, its practical utility.

For example, a claimed invention may be a combination of devices that appear to be directed to a machine and one or more steps of the functions performed by the machine. Such instances of mixed attributes, although potentially confusing as to which category of patentable subject matter it belongs in, does not affect the analysis to be performed by the examiner. Note that an apparatus claim with process steps is not classified as a “hybrid” claim; instead, it is simply an apparatus claim including functional limitations. See, e.g., R.A.C.C. Indus. v. Stun-Tech, Inc., 178 F.3d 1309 (Fed. Cir. 1998) (unpublished).

The burden is on the USPTO to set forth a prima facie case of unpatentability. Therefore if the examiner determines that it is more likely than not that the claimed subject matter falls outside all of the statutory categories, the examiner must provide an explanation. For example, a claim reciting only a musical composition, literary work, compilation of data, or legal document (e.g., an insurance policy) per se does not appear to be a process, machine, manufacture, or composition of matter. If the examiner can establish a prima facie case that a claim does not fall into a statutory category, that does not preclude complete examination of the application for satisfaction of all other conditions of patentability. The examiner must further continue with the statutory subject matter analysis as set forth below. Also, the examiner must still examine the claims for compliance with 35 U.S.C. §§ 102, 103, and 112.

If the invention as set forth in the written description is statutory, but the claims define subject matter that is not, the deficiency can be corrected by an appropriate amendment of the claims. In such a case, USPTO personnel should reject the claims drawn to nonstatutory subject matter under 35 U.S.C. § 101, but identify the features of the invention that would render the claimed subject matter statutory if recited in the claim.

**C. Determine Whether the Claimed Invention Falls Within § 101 Judicial Exceptions – Laws of Nature, Natural Phenomena and Abstract Ideas**

Determining whether the claim falls within one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101 (process, machine, manufacture or composition of matter) does not end the analysis because claims

directed to nothing more than abstract ideas (such as mathematical algorithms), natural phenomena, and laws of nature are not eligible and therefore are excluded from patent protection. Diehr, 450 U.S. at 185, 209 USPQ at 7; accord, e.g., Chakrabarty, 447 U.S. at 309, 206 USPQ at 197; Parker v. Flook, 437 U.S. 584, 589, 198 USPQ 193, 197 (1978); Benson, 409 U.S. at 67-68, 175 USPQ at 675; Funk, 333 U.S. at 130, 76 USPQ at 281. “A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.” Le Roy, 55 U.S. (14 How.) at 175. Instead, such “manifestations of laws of nature” are “part of the storehouse of knowledge,” “free to all men and reserved exclusively to none.” Funk, 333 U.S. at 130, 76 USPQ at 281.

Thus, “a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter” under Section 101. Chakrabarty, 447 U.S. at 309, 206 USPQ at 197. “Likewise, Einstein could not patent his celebrated law that  $E=mc^2$ ; nor could Newton have patented the law of gravity.” Ibid. Nor can one patent “a novel and useful mathematical formula,” Flook, 437 U.S. at 585, 198 USPQ at 195; electromagnetism or steam power, O’Reilly v. Morse, 56 U.S. (15 How.) 62, 113-114 (1853); or “[t]he qualities of \* \* \* bacteria, \* \* \* the heat of the sun, electricity, or the qualities of metals,” Funk, 333 U.S. at 130, 76 USPQ at 281; see Le Roy, 55 U.S. (14 How.) at 175.

While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be. In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole

to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.

**1. Determine Whether the Claimed Invention Covers Either a § 101 Judicial Exception or a Practical Application of a § 101 Judicial Exception**

An examiner must ascertain the scope of the claim to determine whether it covers either a § 101 judicial exception or a practical application of a § 101 judicial exception. The conclusion that a particular claim includes a § 101 judicial exception does not end the inquiry because “[i]t is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.” Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis in original); accord Flook, 437 U.S. at 590, 198 USPQ at 197; Benson, 409 U.S. at 67, 175 USPQ at 675. Thus, “[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.” Diehr, 450 U.S. at 188, 209 USPQ at 8-9 (quoting Mackay, 306 U.S. at 94); see also Corning v. Burden, 56 U.S. (15 How.) 252, 268, 14 L.Ed. 683 (1854)(“It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . .”).

## **2. Determine Whether the Claimed Invention is a Practical Application of an Abstract Idea, Law of Nature, or Natural Phenomenon (§ 101 Judicial Exceptions)**

For claims including such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 (“application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.”); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it “has no substantial practical application”).

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways:

- The claimed invention “transforms” an article or physical object to a different state or thing.
- The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

### **a. Practical Application by Physical Transformation**

The examiner first shall review the claim and determine if it provides a transformation or reduction of an article to a different state or thing. If the examiner finds such a transformation or reduction, the examiner shall end the inquiry and find that the claim meets the statutory requirement of 35 U.S.C. § 101. If the examiner does not find such a transformation or reduction, the examiner has not determined as a final matter that the claim is non-statutory. The examiner must proceed in further inquiry.

b. Practical Application That Produces a Useful, Concrete, and Tangible Result

For eligibility analysis, physical transformation “is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application.” AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. If the examiner determines that the claim does not entail the transformation of an article, then the examiner shall review the claim to determine if the claim provides a practical application that produces a useful, tangible and concrete result. In determining whether the claim is for a “practical application,” the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is “useful, tangible and concrete.” The claim must be examined to see if it includes anything more than a § 101 judicial exception. If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. If the examiner does not find such a practical application, the examiner has determined that the claim is nonstatutory.

In determining whether a claim provides a practical application that produces a useful, tangible, and concrete result, the examiner should consider and weigh the following factors:

(1) “USEFUL RESULT”

For an invention to be “useful” it must satisfy the utility requirement of section 101. The USPTO’s official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible. MPEP §

2107 and Fisher, 421 F.3d at \_\_\_, 76 USPQ2d at 1230 (citing the Utility Guidelines with approval for interpretation of “specific” and “substantial”). In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three § 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention. Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a § 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.

(2) “TANGIBLE RESULT”

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had “no substantial practical application.”). “[A]n application of a law of nature or mathematical formula to a ... process may well be deserving of patent protection.” Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also

Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 (“It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . .”). In other words, the opposite meaning of “tangible” is “abstract.”

### (3) “CONCRETE RESULT”

Another consideration is whether the invention produces a “concrete” result. Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. In re Swartz, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000) (where asserted result produced by the claimed invention is “irreproducible” claim should be rejected under section 101). The opposite of “concrete” is unrepeatable or unpredictable. Resolving this question is dependent on the level of skill in the art. For example, if the claimed invention is for a process which requires a particular skill, to determine whether that process is substantially repeatable will necessarily require a determination of the level of skill of the ordinary artisan in that field. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection under 35 U.S.C. § 112, paragraph 1, where the invention cannot operate as intended without undue experimentation. See infra.

### **3. Determine Whether the Claimed Invention Preempts an Abstract Idea, Law of Nature, or Natural Phenomenon (§ 101 Judicial Exceptions)**

Even when a claim applies a mathematical formula, for example, as part of a seemingly patentable process, the examiner must ensure that it does not in reality “seek[] patent protection for that formula in the abstract.” Diehr, 450 U.S. at 191, 209 USPQ at 10. “Phenomena of nature, though just discovered, mental processes, abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.” Benson, 409 U.S. at 67, 175 USPQ at 675. One may not patent a process that comprises every “substantial practical application” of an abstract idea, because such a patent “in practical effect would be a patent on the [abstract idea] itself.” Benson, 409 U.S. at 71-72, 175 USPQ at 676; cf. Diehr, 450 U.S. at 187, 209 USPQ at 8 (stressing that the patent applicants in that case did “not seek to pre-empt the use of [an] equation,” but instead sought only to “foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process”). “To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection.” Diehr, 450 U.S. at 192, 209 USPQ at 10. Thus, a claim that recites a computer that solely calculates a mathematical formula (see Benson) or a computer disk that solely stores a mathematical formula is not directed to the type of subject matter eligible for patent protection. If an examiner determines that the claimed invention preempts a § 101 judicial exception, the examiner must identify the abstraction, law of nature, or natural phenomenon and explain why the claim covers every substantial practical application thereof.

#### **D. Establish on the Record a Prima Facie Case**

The examiner should review the totality of the evidence (e.g., the specification, claims, relevant prior art) before reaching a conclusion with regard to whether the claimed invention sets forth patent eligible subject matter. The examiner must weigh the determinations made above to reach a conclusion as to whether it is more likely than not that the claimed invention as a whole either falls outside of one of the enumerated statutory classes or within one of the exceptions to statutory subject matter. “The examiner bears the initial burden ... of presenting a prima facie case of unpatentability.” In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If the record as a whole suggests that it is more likely than not that the claimed invention would be considered a practical application of an abstract idea, natural phenomenon, or law of nature, the examiner should not reject the claim.

After the examiner identifies and explains in the record the basis for why a claim is for an abstract idea with no practical application, then the burden shifts to the applicant to either amend the claim or make a showing of why the claim is eligible for patent protection. See, e.g., In re Brana, 51 F.3d 1560, 1566, 34 USPQ2d 1436, 1441 (Fed. Cir. 1995); see generally MPEP § 2107 (Utility Guidelines).

## **V. EVALUATE APPLICATION FOR COMPLIANCE WITH 35 U.S.C. § 112**

### **A. Determine Whether the Claimed Invention Complies with 35 U.S.C. § 112,**

#### **Second Paragraph Requirements (MPEP § 2171)**

The second paragraph of 35 U.S.C. § 112 contains two separate and distinct requirements: (A) that the claim(s) set forth the subject matter applicants regard as the invention, and (B) that the claim(s) particularly point out and distinctly claim the invention.

An application will be deficient under the first requirement of 35 U.S.C. § 112, second paragraph when evidence including admissions, other than in the application as filed, shows applicant has stated that he or she regards the invention to be different from what is claimed (see MPEP § 2171-2172.01).

An application fails to comply with the second requirement of 35 U.S.C. § 112, second paragraph when the claims do not set out and define the invention with a reasonable degree of precision and particularity. In this regard, the definiteness of the language must be analyzed, not in a vacuum, but always in light of the teachings of the disclosure as it would be interpreted by one of ordinary skill in the art.

Applicant's claims, interpreted in light of the disclosure, must reasonably apprise a person of ordinary skill in the art of the invention.

The scope of a "means" limitation is defined as the corresponding structure or material set forth in the written description and equivalents. See MPEP § 2181 through § 2186. See MPEP § 2173 et seq. for a discussion of a variety of issues pertaining to the 35 U.S.C. § 112, second paragraph requirement that the claims particularly point out and distinctly claim the invention.

**B. Determine Whether the Claimed Invention Complies with 35 U.S.C. § 112,**

**First Paragraph Requirements (MPEP § 2161)**

The first paragraph of 35 U.S.C. § 112 contains three separate and distinct requirements:

- (A) adequate written description,
- (B) enablement, and
- (C) best mode.

**1. Adequate Written Description (MPEP § 2163)**

For the written description requirement, an applicant's specification must reasonably convey to those skilled in the art that the applicant was in possession of the claimed invention as of the date of invention. Regents of the University of California v. Eli Lilly & Co., 119 F.3d 1559, 1566-67, 43 USPQ2d 1398, 1404-05 (Fed. Cir. 1997); Hyatt v. Boone, 146 F.3d 1348, 1354, 47 USPQ2d 1128, 1132 (Fed. Cir. 1998). The claimed invention subject matter need not be described literally, i.e., using the same terms, in order for the disclosure to satisfy the description requirement. Software aspects of inventions, for example, may be described functionally. See Robotic Vision Sys. v. View Eng'g, Inc., 112 F.3d 1163, 1166, 42 USPQ2d 1619, 1622-23 (Fed. Cir. 1997); Fonar Corp. v. General Electric Co., 107 F.3d 1543, 1549, 41 USPQ2d 1801, 1805 (Fed. Cir. 1997); In re Hayes Microcomputer Prods., Inc., 982 F.2d 1527, 1537-38, 25 USPQ2d 1241, 1248-49 (Fed. Cir. 1992). See MPEP § 2163 for further guidance with respect to the

evaluation of a patent application for compliance with the written description requirement.

## **2. Enabling Disclosure (MPEP § 2164)**

An applicant's specification must enable a person skilled in the art to make and use the claimed invention without undue experimentation. The fact that experimentation is complex, however, will not make it undue if a person of skill in the art typically engages in such complex experimentation. See MPEP § 2164 et seq. for detailed guidance with regard to the enablement requirement of 35 U.S.C. § 112, first paragraph.

## **3. Best Mode (MPEP § 2165)**

Determining compliance with the best mode requirement requires a two-prong inquiry:

(1) at the time the application was filed, did the inventor possess a best mode for practicing the invention; and

(2) if the inventor did possess a best mode, does the written description disclose the best mode such that a person skilled in the art could practice it.

See MPEP § 2165 et seq for additional guidance. Deficiencies related to disclosure of the best mode for carrying out the claimed invention are not usually encountered during examination of an application because evidence to support such a deficiency is seldom in the record. Fonar, 107 F.3d at 1548-49, 41 USPQ2d at 1804-05.

## **VI. DETERMINE WHETHER THE CLAIMED INVENTION COMPLIES WITH 35 U.S.C. § 102 AND 103**

Reviewing a claimed invention for compliance with 35 U.S.C. § 102 and 103 begins with a comparison of the claimed subject matter to what is known in the prior art. See MPEP § 2131 – 2146 for specific guidance on patentability determinations under 35 U.S.C. § 102 and 103. If no differences are found between the claimed invention and the prior art, the claimed invention lacks novelty and is to be rejected by USPTO personnel under 35 U.S.C. § 102. Once differences are identified between the claimed invention and the prior art, those differences must be assessed and resolved in light of the knowledge possessed by a person of ordinary skill in the art. Against this backdrop, one must determine whether the invention would have been obvious at the time the invention was made. If not, the claimed invention satisfies 35 U.S.C. § 103.

## **VII. CLEARLY COMMUNICATE FINDINGS, CONCLUSIONS AND THEIR BASES**

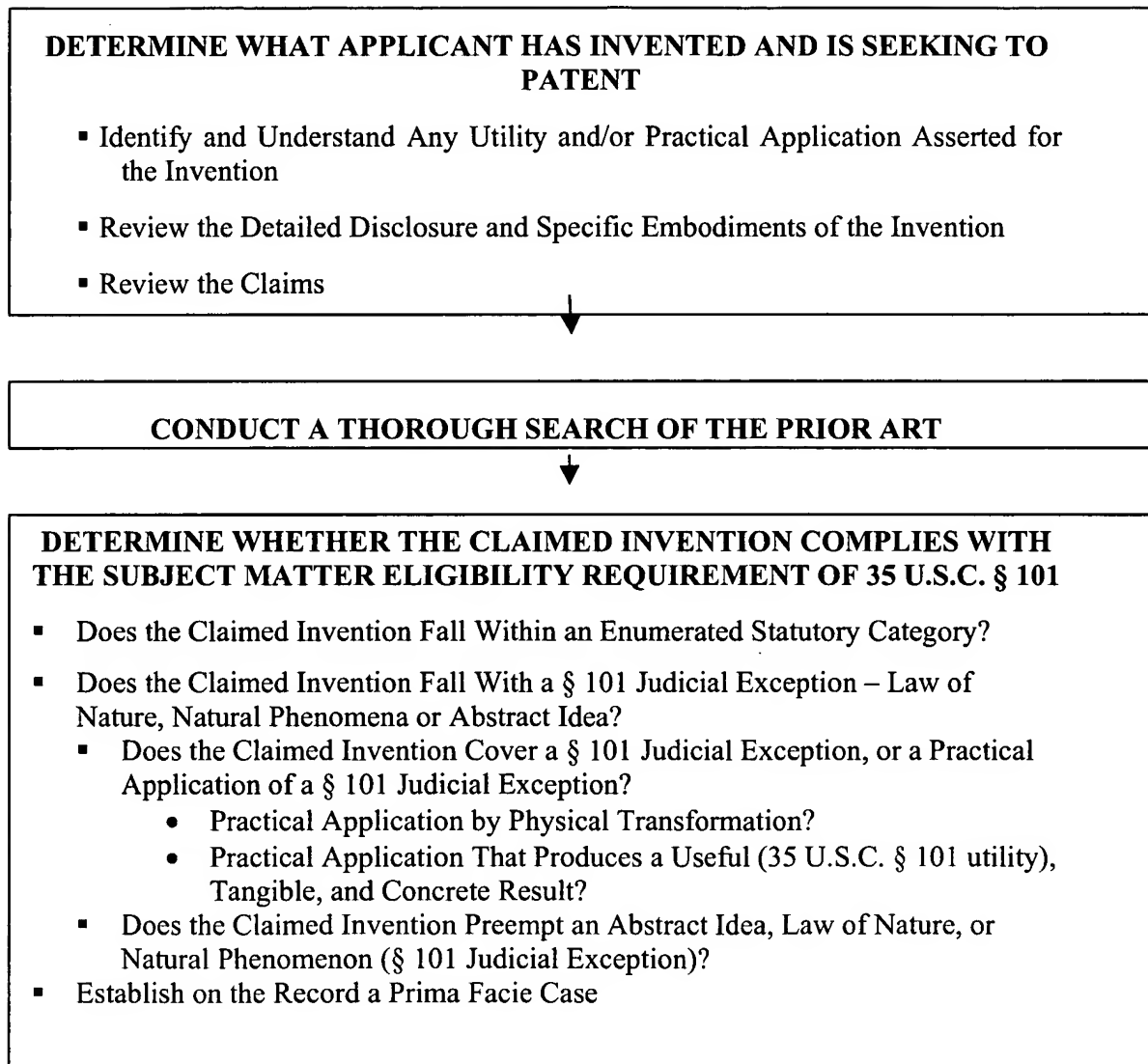
Once USPTO personnel have concluded the above analyses of the claimed invention under all the statutory provisions, including 35 U.S.C. §§ 101, 112, 102 and 103, they should review all the proposed rejections and their bases to confirm that the examiner is able to set forth a prima facie case of unpatentability. Only then should any rejection be imposed in an Office action. The Office action should clearly communicate the findings, conclusions and reasons which support them.

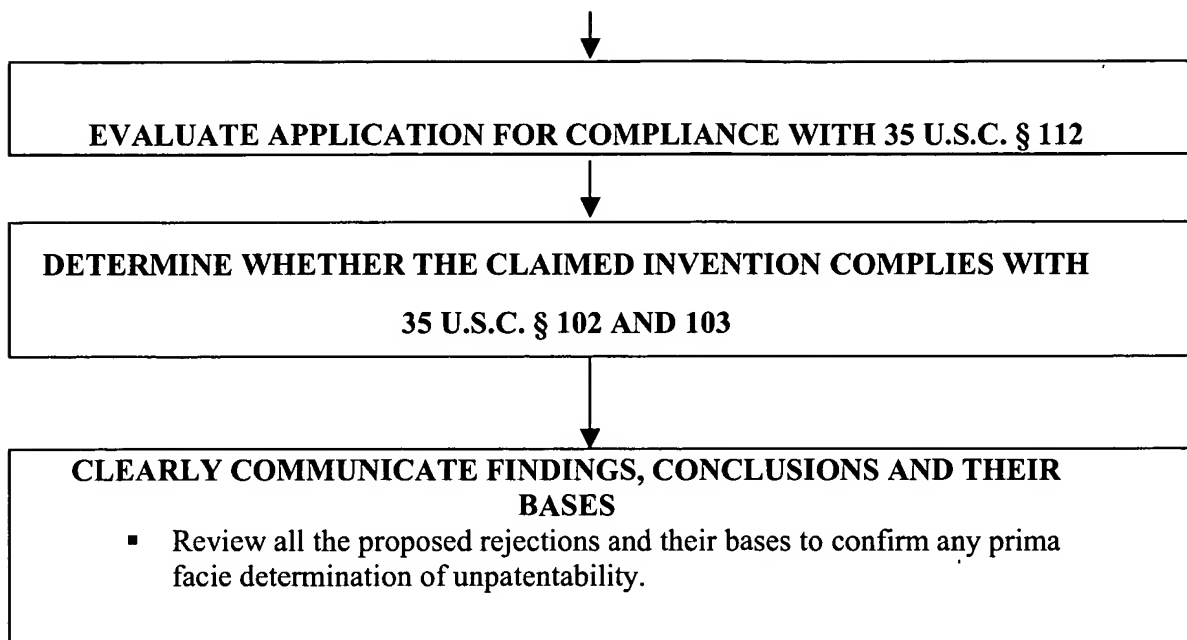
Date: 10/26/05

/s/  
JOHN J. DOLL  
Commissioner for Patents

## ANNEX I

### FLOWCHART FOR SUBJECT MATTER ELIGIBILITY





**See also:**

**ANNEX II Case Law Defining the Line Between Eligible and Ineligible Subject Matter**

**ANNEX III Improper Tests**

**ANNEX IV Computer-Related Nonstatutory Subject Matter**

**ANNEX V Mathematical Algorithms**

## ANNEX II

### Case Law Defining the Line Between Eligible and Ineligible Subject Matter

#### A. Supreme Court

##### i. “Anything Under the Sun That Is Made by Man”

To be eligible for patent protection, the subject matter of the invention or discovery must come within the boundaries set forth by 35 U.S.C. § 101, which permits patents to be granted only for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.”

A machine is “a concrete thing, consisting of parts or of certain devices and combinations of devices.” Burr v. Duryee, 68 U.S. (1 Wall.) 531, 570 (1863).

A manufacture is “the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties or combinations, whether by hand labor or by machinery.” Chakrabarty, 447 U.S. at 308, 206 USPQ at 196-97 (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11 (1931)).

A composition of matter is “a composition of two or more substances [or] . . . a[] composite article, whether [it] be the result[] of chemical union, or of mechanical mixture, or whether . . . [it] be [a] gas[], fluid[], powder[], or solid[.]” Id. at 308, 206 USPQ at 197 (quoting Shell Development Co. v. Watson, 149 F. Supp. 279, 280, [113 USPQ 265, 266] (D.D.C. 1957), aff’d per curiam, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958)).

A claim that requires one or more acts to be performed defines a process. However, not all processes are statutory under 35 U.S.C. § 101. To be statutory, a

claimed process must either: (A) result in a physical transformation for which a practical application is either disclosed in the specification or would have been known to a skilled artisan, or (B) be limited to a practical application which produces a useful, tangible, and concrete result. See Diehr, 450 U.S. at 183-84, 209 USPQ at 6 (quoting Cochrane v. Deener, 94 U.S. 780, 787-88 (1876)) (“A [statutory] process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing.... The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.”). See also Alappat, 33 F.3d at 1543, 31 USPQ2d at 1556-57 (quoting Diehr, 450 U.S. at 192, [209 USPQ at 10]). See also id. at 1569, 31 USPQ2d at 1578-79 (Newman, J., concurring) (“unpatentability of the principle does not defeat patentability of its practical applications”) (citing O’Reilly, 56 U.S. (15 How.) at 114-19).

In evaluating whether a claim meets the requirements of section 101, the Supreme Court requires that the claim be considered as a whole to determine whether it is for a particular application of an abstract idea, rather than for the abstract idea itself. The Supreme Court has noted that the scope of patentable subject matter is generally quite broad, stating that “Congress intended statutory subject matter to ‘include anything under the sun that is made by man.’” Diehr, 450 U.S. at 182, 209 USPQ at 6 (quoting S. Rep. No. 1979, 82d Cong., 2d Sess. 5 (1952); H.R. Rep. No. 1923, 82 Cong., 2d Sess. 6 (1952)).

ii. Exceptions: Laws of Nature, Natural Phenomena and Abstract Ideas

“Excluded from such patent protection,” however, are “laws of nature, natural phenomena, and abstract ideas.” Diehr, 450 U.S. at 185, 209 USPQ at 7; accord, e.g., Chakrabarty, 447 U.S. at 309, 206 USPQ at 197; Flook, 437 U.S. at 589, 198 USPQ at 197; Benson, 409 U.S. at 67-68, 175 USPQ at 675; Funk, 333 U.S. at 130, 76 USPQ at 281. “A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.” Le Roy, 55 U.S. (14 How.) at 175. Instead, such “manifestations of laws of nature” are “part of the storehouse of knowledge,” “free to all men and reserved exclusively to none.” Funk, 333 U.S. at 130, 76 USPQ at 281.

Thus, “a new mineral discovered in the earth or a new plant found in the wild is not patentable subject matter” under Section 101. Chakrabarty, 447 U.S. at 309, 206 USPQ at 197. “Likewise, Einstein could not patent his celebrated law that  $E=mc^2$ ; nor could Newton have patented the law of gravity.” Ibid. Nor can one patent “a novel and useful mathematical formula,” Flook, 437 U.S. at 585, 198 USPQ at 195; electromagnetism or steam power, O’Reilly, 56 U.S. (15 How.) at 113-114; or “[t]he qualities of \* \* \* bacteria, \* \* \* the heat of the sun, electricity, or the qualities of metals,” Funk, 333 U.S. at 130, 76 USPQ at 281; see Le Roy, 55 U.S. (14 How.) at 175.

iii. Practical Application of a Law of Nature or Abstract Idea Is Eligible

The conclusion that a particular claim includes an abstract idea does not end the inquiry, however, because “[i]t is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be

deserving of patent protection.” Diehr, 450 U.S. at 187, 209 USPQ at 8 (emphasis in original); accord Flook, 437 U.S. at 590, 198 USPQ at 197; Benson, 409 U.S. at 67, 175 USPQ at 675. Thus, “[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.” Diehr, 450 U.S. at 188, 209 USPQ at 8-9 (quoting Mackay, 306 U.S. at 94); see also Corning, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 (“It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . .”).

iv. Transformation Is Evidence of Eligibility

In the case where a claim is for a process, as opposed to a product, “[t]he line between a patentable ‘process’ and an unpatentable ‘principle’ is not always clear.” Flook, 437 U.S. at 589, 198 USPQ at 197. In general, however, the “[t]ransformation and reduction of an article ‘to a different state or thing’ is the clue to patentability of a process claim that does not include particular machines.” Diehr, 450 U.S. 184, 209 USPQ at 7 (quoting Benson, 409 U.S. at 70); see Flook, 437 U.S. at 588-89 & n.9, 198 USPQ at 196-97 & n.9; Cochrane v. Deener, 94 U.S. 780, 787-788 (1876). For example, the Supreme Court has held that although one cannot patent a mathematical formula, a multi-step process for curing synthetic rubber that makes use of such a formula is patentable. Diehr, 450 U.S. at 186-87, 209 USPQ at 8.

v. No Preemption Permitted

Even when a claim applies a mathematical formula, for example, as part of a seemingly patentable process, however, one must ensure that it does not in reality “seek[] patent protection for that formula in the abstract.” Diehr, 450 U.S. at 191,

209 USPQ at 10. One may not patent a process that comprises every “substantial practical application” of an abstract idea , because such a patent “in practical effect would be a patent on the [abstract idea] itself.” Benson, 409 U.S. at 71-72, 175 USPQ at 676; cf. Diehr, 450 U.S. at 187, 209 USPQ at 8 (stressing that the patent applicants in that case did “not seek to pre-empt the use of [an] equation,” but instead sought only to “foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process”). Such limitations on process patents are important because without them, “a competent draftsman [could] evade the recognized limitations on the type of subject matter eligible for patent protection.” Diehr, 450 U.S. at 192, 209 USPQ at 10; accord Flook, 437 U.S. at 590, 198 USPQ at 197. Thus, a claim that recites a computer that solely calculates a mathematical formula (see Benson), a computer disk that solely stores a mathematical formula, or a electromagnetic carrier signal that carries solely a mathematical formula is not statutory.

vi. Claim Must Be Considered as a Whole

Only “when a claim containing [an abstract idea] implements or applies that [idea] in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect,” does “the claim satisf[y] the requirements of § 101.” Diehr, 450 U.S. at 192, 209 USPQ at 10.

B. Federal Circuit

i. “Practical Application of an Abstract Idea”

While the Supreme Court has ruled that “transformation” is relevant to a section 101 inquiry, the Court has expressly refused to hold that it is the only test for

determining patent eligibility. The Federal Circuit has provided further guidance in distinguishing between the judicially-created exceptions to patentable subject matter and eligible subject matter. The focus of the inquiry is whether the claim, considered as a whole, constitutes “a practical application of an abstract idea.” State Street, 149 F.3d at 1373, 47 USPQ2d at 1600 . Thus, the question of whether a claim encompasses statutory subject matter should not focus on which category of subject matter a claim is directed to (e.g. process or machine), “but rather on the essential characteristics of the subject matter, in particular its practical utility.” State Street, 149 F.3d at 1375, 47 USPQ2d at 1602 ; see also AT&T, 172 F.3d at 1360, 50 USPQ2d at 1453 (focus on section 101 inquiry is “whether the mathematical algorithm was applied in a practical manner”). Accordingly, an “abstract idea” when practically applied to a useful end is eligible for a patent. State Street, 149 F.3d at 1374, 47 USPQ2d at 1601 (“a process, machine, manufacture, or composition of matter employing a law of nature, natural phenomenon, or abstract idea is patentable subject matter even though a law of nature, natural phenomenon, or abstract idea would not, by itself, be entitled to such protection.”) (emphasis added); see also Alappat, 33 F.3d at 1543, 31 USPQ2d at 1556-57(holding that “certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, and thus that subject matter is not, in and of itself, entitled to patent protection.”).

ii. “Useful, Concrete and Tangible Result”

In State Street, the Federal Circuit examined some of its prior section 101 cases, observing that the claimed inventions in those cases were each for a “practical

application of an abstract idea” because the elements of the invention operated to produce a “useful, concrete and tangible result.” State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. For example, the court in State Street noted that the claimed invention in Alappat “constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it produced ‘a useful, concrete and tangible result’—the smooth waveform.” Id. Similarly, the claimed invention in Arrhythmia “constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete and tangible thing—the condition of a patient’s heart.” Id.

In determining whether the claim is for a “practical application,” the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result is “useful, tangible and concrete.” The Federal Circuit further ruled that it is of little relevance whether a claim is directed to a machine or process for the purpose of a § 101 analysis. AT&T, 172 F.3d at 1358, 50 USPQ2d at 1451.

A claim limited to a machine or manufacture, which has a practical application, is statutory. In most cases, a claim to a specific machine or manufacture will have a practical application. See Alappat, 33 F.3d at 1544, 31 USPQ2d at 1557 (“the claimed invention as a whole is directed to a combination of interrelated elements which combine to form a machine for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means. This is not a disembodied mathematical concept which may be characterized as an ‘abstract idea,’ but rather a specific machine to produce a useful, concrete, and tangible

result.”); and State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02 (“the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’ – a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.”). Also see AT&T, 172 F.3d at 1358, 50 USPQ2d at 1452 (Claims drawn to a long-distance telephone billing process containing mathematical algorithms were held patentable subject matter because the process used the algorithm to produce a useful, concrete, tangible result without preempting other uses of the mathematical principle.).

iii. Transformation of Articles

The Supreme Court noted that one example of a statutory “process” is where the process steps provide a transformation or reduction of an article to a different state or thing. Diehr, 450 U.S. at 183, 209 USPQ at 6. The Federal Circuit has explained, however, that the physical transformation test is not an invariable requirement in order for a claim to have statutory subject matter. The Federal Circuit best explains:

The notion of “physical transformation” can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, “when [a claimed invention] is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a

different state or thing), then the claim satisfies the requirements of § 101.” Diamond v. Diehr, 450 U.S. at 192 (emphasis added). The “e.g.” signal denotes an example, not an exclusive requirement. AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. Thus, physical transformation is only one example of a practical or useful application of an abstract idea.

iv. Schrader and Grams distinguished

In the AT&T decision, the Federal Circuit stated that Schrader and Grams were not persuasive because the Schrader court and the Grams court relied upon the Freeman-Walter-Abele test instead of determining if the subject matter was applied in a practical manner to produce a useful, concrete and tangible result. The Federal Circuit stated:

In re Grams [888 F.2d 835, 12 USPQ2d 1824 (Fed. Cir. 1989)] is unhelpful because the panel in that case did not ascertain if the end result of the claimed process was useful, concrete, and tangible. Similarly, the court in In re Schrader [22 F.3d 290, 30 USPQ2d 1455 (Fed. Cir. 1994)] relied on the Freeman-Walter-Abele test for its analysis of the method claim involved. The court found neither a physical transformation nor any physical step in the claimed process aside from the entering of data into a record. See 22 F.3d at 294, 30 USPQ2d at 1458. The Schrader court likened the data-recording step to that of data-gathering and held that the claim was properly rejected as failing to define patentable subject matter. See id. at 294, 296, 30

USPQ2d at 1458-59. The focus of the court in Schrader was not on whether the mathematical algorithm was applied in a practical manner since it ended its inquiry before looking to see if a useful, concrete, tangible result ensued. Thus, in light of our recent understanding of the issue, the Schrader court's analysis is as unhelpful as that of In re Grams.

AT&T, 172 F.3d at 1360, 50 USPQ2d at 1453. Accordingly, the Federal Circuit has made clear that Schrader and Grams are not helpful in analyzing claims under section 101.

## ANNEX III

### Improper Tests For Subject Matter Eligibility

As set forth in the patent eligible subject matter interim guidelines, a practical application of a 35 U.S.C. § 101 judicial exception is claimed if the claimed invention physically transforms an article or physical object to a different state or thing, or if the claimed invention otherwise produces a useful, concrete, and tangible result.

Therefore the following tests are **not** to be applied by examiners in determining whether the claimed invention is patent eligible subject matter:

- (A) "not in the technological arts" test
- (B) Freeman-Walter-Abele test
- (C) mental step or human step tests
- (D) the machine implemented test
- (E) the per se data transformation test.

#### a. Technological Arts Test

United States patent law does not support the application of a "technical aspect" or "technological arts" requirement. Title 35 of the United States Code does not recite, explicitly or implicitly, that inventions must be within the "technological arts" to be patentable. Section 101 of Title 35 recites that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor..." Accordingly, while an invention must be "new" and "useful," there is no statutory requirement that it fit within a category of "technological arts." Moreover,

although there has been some judicial discussion of the expression "technological arts" and its relationship to patentability, this dialogue has been rather limited and its viability is questioned. In 1970, the Court in In re Musgrave [431 F.2d 882, 167 USPQ 280 (CCPA 1970)] introduced a new standard for evaluating process claims under Section 101: any sequence of operational steps is a patentable process so long as it is within the technological arts so as to promote the progress of useful arts. Since the announcement of a new "technological arts" standard in Musgrave, only fourteen cases make reference to this so-called "technological arts" standard. In fact, only a handful of cases immediately following the Musgrave decision employed the "technological arts" standard in determining whether an invention is a process within the framework of Section 101. Instead, the Supreme Court refused to adopt that test when it reversed the Court of Customs and Patent Appeals in Gottschalk v. Benson, 409 U.S. 63, 175 USPQ 673 (1972). See also Diehr, 450 U.S. at 201, 209 USPQ at 14 (J. Stevens dissenting) (discussing the Court did not recognize the lower court's technological arts standard). Moreover, the CCPA effectively rejected the technological arts test in In re Toma, 575 F.2d 872, 878, 197 USPQ 852, 857 (CCPA 1978), by strongly suggesting that Musgrave was never intended to create a technological arts test for patent eligibility:

The language which the examiner has quoted [from Musgrave and its progeny relating to "technological arts"] was written in answer to "mental steps rejections and was not intended to create a generalized definition of statutory subject matter. Moreover, it was not intended to

form a basis for a new § 101 rejection as the examiner apparently suggests.

Toma, 575 F.2d at 878, 197 USPQ at 857.

In addition, the "technological arts" consideration is completely absent from recent Federal Circuit case law like State Street and AT&T. Given the current trend in the law, the Musgrave test should not be considered as current legal jurisprudence, and should not be used to evaluate process inventions for compliance with Section 101.

More important, the Musgrave decision should not be interpreted as imposing a new requirement that certain inventions be in the "technological arts" to be patentable. Instead, Musgrave should be limited to its facts and holding, i.e., that the computer-related invention in dispute was a patentable invention within the meaning of Section 101 because it was an advancement in technology which clearly promoted the useful arts. Thus, the Musgrave decision should not be construed as announcing a new stand-alone "technological arts" test for patentability, but should stand for the proposition that computer-implemented process claims may be patentable subject matter.

Furthermore, any attempts to define what is "in the technological arts" raises more questions that it appears to answer. The mere application of an article or a computer does not automatically qualify as eligible subject matter. See, e.g., Benson, 409 U.S. 63, 175 USPQ 673. Thus, this potential analysis improperly focuses on how the invention is implemented rather than on what is the practical application and the result that is achieved.

The emergence of a new patentability requirement that is not firmly rooted in our law also creates significant international concerns. First, the United States is a leader in intellectual property protection and strongly supports patent protection for all subject matter regardless of whether there is a "technical aspect" or the invention is in the "technological arts." The application of a 'technological art' requirement could be used to preclude the patenting of certain inventions not only in the United States, but also in other jurisdictions.

In Ex parte Lundgren, Appeal No. 2003-2088, Application 08/093,516, (Precedential BPAI opinion September 2005), the Board rejected the examiner's argument that Musgrave and Toma created a technological arts test. "We do not believe the court could have been any clearer in rejecting the theory the present examiner now advances in this case." Lundgren, at 8. The Board held that "there is currently no judicially recognized separate "technological arts" test to determine patent eligible subject matter under § 101." Lundgren at 9.

USPTO personnel should no longer rely on the technological arts test to determine whether a claimed invention is directed to statutory subject matter. There is no other recognized exceptions to eligible subject matter other than laws of nature, natural phenomena, and abstract ideas.

#### b. Freeman-Walter-Abele Test

USPTO personnel should not rely on the Freeman-Walter-Abele test to determine whether a claimed invention is directed to statutory subject matter. The Federal Circuit questioned the continuing viability of the Freeman-Walter-Abele test, noting that "[a]fter Diehr and Chakrabarty, the Freeman-Walter-Abele test has little,

if any, applicability to determining the presence of statutory subject matter.” State Street, 149 F.3d at 1374, 47 USPQ2d at 1601.

The Federal Circuit further stated “after Diehr and Alappat, the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers and storing numbers, in and of itself, would not render it nonstatutory . . . .” State Street, 149 F.3d at 1374, 47 USPQ2d at 1602 (citing In re Alappat, 33 F.3d at 1544, 31 USPQ2d at 1557). The Federal Circuit in an en banc decision pointed out that “the ultimate issue always has been whether the claim as a whole is drawn to statutory subject matter.” Alappat, 33 F.3d at 1543 n. 21, 31 USPQ2d at 1557 n. 21.

In AT&T, the Federal Circuit focused the inquiry on whether the claim as a whole is drawn to statutory subject matter, deemed the “ultimate issue” by Alappat, rather than on the Freeman-Walter-Abele test which dissects the claim by removing the labeled nonstatutory subject matter and then labels the remaining portion of the claim as either data gathering steps or insignificant post solution activity. AT&T, 172 F.3d at 1359, 50 USPQ2d at 1453. The Federal Circuit concluded that “[w]hatever may be left of the earlier [Freeman-Walter-Abele] test, if anything, this type of physical limitations analysis seems of little value.” Id. Therefore, USPTO personnel should no longer rely on the Freeman-Walter-Abele test to determine whether a claimed invention is directed to statutory subject matter.

c. (i) The Mental Step Test

If a claimed process is performed by a machine, it is immaterial whether some or all the steps could be carried out by the human mind. As stated in Musgrave, 431

F.2d at 893, 167 USPQ at 289-90: “[w]e cannot agree with the board that these claims (all the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because **some or all** [emphasis added] the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think.” Therefore, USPTO personnel should no longer rely on the mental step test to determine whether a claimed invention is directed to statutory subject matter. If all the steps of a claimed process can be carried out in the human mind, examiners must determine whether the claimed process produces a useful, tangible, and concrete result, i.e., apply the practical application test set forth in State Street.

c. (ii) The Human Step Test

It is immaterial whether the process may be performed by some or all steps that are carried out by a human. Claims are not directed to non-statutory processes merely because **some or all** the steps therein can also be carried out in or with the aid of a human or because it may be necessary for one performing the processes to do some or all of the process steps. The inclusion in a patent of a process that may be performed by a person is not fatal to patentability. Alco Standard Corp. v. Tennessee Valley Authority, 808 F.2d 1490, 1496, 1 USPQ2d 1337, 1341 (Fed. Cir. 1987) (citing Diehr, 450 U.S. at 175); see e.g. Smith & Nephew, Inc. v. Ethicon, Inc., 276 F.3d 1304, 61 USPQ2d 1065 (Fed. Cir. 2001) (method claim where all the steps are carried out by a human). Therefore, USPTO personnel should no longer rely on the human step test to determine whether a claimed invention is directed to statutory subject matter.

d. Machine Implemented Test

Whether a claim recites a machine implemented process is not determinative of whether that process claim is statutory. Such a test would recognize that an abstraction merely implemented on a computer is statutory. An example will illustrate the point. Assume that  $y = 2x + C$ , where  $x$  and  $C$  are positive real numbers, is nothing more than an abstract idea. The claim recites: a computer- implemented process comprising providing  $x$  and  $C$  defined as positive real numbers, multiplying  $x$  by 2 to get  $Z$  and determining  $y$  by adding  $C$  to  $Z$ . Thus, the claim is nothing more than an abstract idea which is machine implemented and such a claim is not statutory. See, e.g., Benson, 409 U.S. 63, 175 USPQ 673 (finding machine-implemented method of converting binary-coded decimal numbers into pure binary numbers unpatentable). However, using the machine implemented test, the claim would be found to be statutory.

The Federal Circuit held that the mere manipulations of abstract ideas are not patentable. Schrader, 22 F.3d at 292-93, 30 USPQ2d at 1457-58. If a claimed process manipulates only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the claim is not being applied to appropriate subject matter. Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1458-59. The Federal Circuit also recognizes that the fact that a nonstatutory method is carried out on a programmed computer does not make the process claim statutory. Grams, 888 F.2d at 841, 12 USPQ2d at 1829(claim 16 ruled nonstatutory even though it was a computer-implemented process).

In addition, the Federal Circuit has recently noted that a “structural inquiry is unnecessary” when determining whether a process claim is eligible for patent protection. AT&T, 172 F.3d at 1359, 50 USPQ2d at 1452.

Thus, a finding that a claim fails to recite a computer-implemented process is not determinative in whether that claim passes muster under § 101. Therefore, USPTO personnel should no longer rely on the machine implemented test to determine whether a claimed invention is directed to statutory subject matter.

e. Per Se Data Transformation Test

Identifying that a claim transforms data from one value to another is not by itself sufficient for establishing that the claim is eligible for patent protection. See, e.g., Benson, 409 U.S. 63, 175 USPQ 673 (finding machine-implemented method of converting binary-coded decimal numbers into pure binary numbers unpatentable). In Benson, the claims invention was held to be merely a series of mathematical calculations having “no substantial practical application.” Id. at 71, 175 USPQ at 676. Therefore, claims that perform data transformation must still be examined for whether there is a practical application of an abstract idea that produces a useful, concrete, and tangible result.

## ANNEX IV

### Computer-Related Nonstatutory Subject Matter

Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” In this context, “functional descriptive material” consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of “data structure” is “a physical or logical relationship among data elements, designed to support specific data manipulation functions.” The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) “Nonfunctional descriptive material” includes but is not limited to music, literary works and a compilation or mere arrangement of data.

Both types of “descriptive material” are nonstatutory when claimed as descriptive material per se. Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

When nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory since no requisite functionality is present to satisfy the practical application requirement. Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored in a computer-readable medium, in a computer, on an electromagnetic carrier signal does not make it statutory. See Diehr, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in Benson were unpatentable as abstract ideas because “[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer.”). Such a result would exalt form over substance. In re Sarkar, 588 F.2d 1330, 1333, 200 USPQ 132, 137 (CCPA 1978) (“[E]ach invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final analysis under § 101, the claimed invention, as a whole, must be evaluated for what it is.”) (quoted with approval in Abele, 684 F.2d at 907, 214 USPQ at 687). See also In re Johnson, 589 F.2d 1070, 1077, 200 USPQ 199, 206 (CCPA 1978) (“form of the claim is often an exercise in drafting”). Thus, nonstatutory music is not a computer component and it does not become statutory by merely recording it on a compact disk. Protection for this type of work is provided under the copyright law.

When nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory and should be rejected under 35 U.S.C. § 101. In addition, the examiner should inquire whether there should be a rejection under 35 U.S.C. § 102 or 103. The examiner should determine whether the claimed nonfunctional descriptive material be given

patentable weight. The USPTO must consider all claim limitations when determining patentability of an invention over the prior art. In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983). The USPTO may not disregard claim limitations comprised of printed matter. See Gulack, 703 F.2d at 1384, 217 USPQ at 403; see also Diehr, 450 U.S. at 191, 209 USPQ at 10. However, the examiner need not give patentable weight to printed matter absent a new and unobvious functional relationship between the printed matter and the substrate. See In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994); In re Ngai, 367 F.3d 1336, 70 USPQ2d 1862 (Fed. Cir. 2004).

**(a) Functional Descriptive Material: “Data Structures” Representing Descriptive Material Per Se or Computer Programs Representing Computer Listings Per Se**

Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure’s functionality to be realized. In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure’s functionality to be realized, and is thus statutory.

Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical “things.” They are neither computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program’s functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program’s functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material per se from claims that define statutory inventions.

Computer programs are often recited as part of a claim. USPTO personnel should determine whether the computer program is being claimed as part of an otherwise statutory manufacture or machine. In such a case, the claim remains statutory irrespective of the fact that a computer program is included in the claim. The same result occurs when a computer program is used in a computerized process where the computer executes the instructions set forth in the computer program. Only when the claimed invention taken as a whole is directed to a mere program listing, i.e., to only its description or expression, is it descriptive material per se and hence nonstatutory. Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process and USPTO personnel

should treat a claim for a computer program, without the computer-readable medium needed to realize the computer program's functionality, as nonstatutory functional descriptive material. When a computer program is claimed in a process where the computer is executing the computer program's instructions, USPTO personnel should treat the claim as a process claim. See paragraph IV.B.2(b), below. When a computer program is recited in conjunction with a physical structure, such as a computer memory, USPTO personnel should treat the claim as a product claim. See paragraph IV.B.2(a), below.

#### **(b) Nonfunctional Descriptive Material**

Nonfunctional descriptive material that does not constitute a statutory process, machine, manufacture or composition of matter and should be rejected under 35 U.S.C. § 101. Certain types of descriptive material, such as music, literature, art, photographs and mere arrangements or compilations of facts or data, without any functional interrelationship is not a process, machine, manufacture or composition of matter. USPTO personnel should be prudent in applying the foregoing guidance.

Nonfunctional descriptive material may be claimed in combination with other functional descriptive multi-media material on a computer-readable medium to provide the necessary functional and structural interrelationship to satisfy the requirements of 35 U.S.C. § 101. The presence of the claimed nonfunctional descriptive material is not necessarily determinative of nonstatutory subject matter. For example, a computer that recognizes a particular grouping of musical notes read from memory and upon recognizing that particular sequence, causes another defined series of notes to be played, defines a functional interrelationship among that data and

the computing processes performed when utilizing that data, and as such is statutory because it implements a statutory process.

**(c) Electro-Magnetic Signals**

Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101.

First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents § 1.02 (1994). The three product classes have traditionally required physical structure or material.

"The term machine includes every mechanical device or combination of mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." Corning v. Burden, 56 U.S. (15 How.) 252, 267 (1854). A modern definition of machine would no doubt include electronic devices which perform functions. Indeed, devices such as flip-flops and computers are referred to in computer science as sequential machines. A claimed signal has no physical structure, does not itself perform any useful, concrete and tangible result and, thus, does not fit within the definition of a machine.

A "composition of matter" "covers all compositions of two or more substances and includes all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." Shell Development Co. v. Watson, 149 F. Supp. 279, 280, 113 USPQ 265, 266 (D.D.C. 1957), aff'd, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958). A claimed signal is not matter, but a form of energy, and therefore is not a composition of matter.

The Supreme Court has read the term "manufacture" in accordance with its dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." Diamond v. Chakrabarty, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which, in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See American Disappearing Bed Co. v. Arnaelsteen, 182 F. 324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which a claimed signal does not have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. Lorillard v. Pons, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in American Fruit Growers when it passed the 1952 Patent Act.

A manufacture is also defined as the residual class of product. 1 Chisum, § 1.02[3] (citing W. Robinson, The Law of Patents for Useful Inventions 270 (1890)).

A product is a tangible physical article or object, some form of matter, which a signal is not. That the other two product classes, machine and composition of matter, require physical matter is evidence that a manufacture was also intended to require physical matter. A signal, a form of energy, does not fall within either of the two definitions of manufacture. Thus, a signal does not fall within one of the four statutory classes of § 101.

On the other hand, from a technological standpoint, a signal encoded with functional descriptive material is similar to a computer-readable memory encoded with functional descriptive material, in that they both create a functional interrelationship with a computer. In other words, a computer is able to execute the encoded functions, regardless of whether the format is a disk or a signal.

These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of § 101. Public comment is sought for further evaluation of this question.

## ANNEX 5

### Mathematical Algorithms

Claims to processes that do nothing more than solve mathematical problems or manipulate abstract ideas or concepts are complex to analyze and are addressed herein.

If the “acts” of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Benson, 409 U.S. at 71-72, 175 USPQ at 676. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

In practical terms, claims define nonstatutory processes if they:

- consist solely of mathematical operations without some claimed practical application (i.e., executing a “mathematical algorithm”); or
- simply manipulate abstract ideas, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759), without some claimed practical application.

Cf. Alappat, 33 F.3d at 1543 n.19, 31 USPQ2d at 1556 n.19 in which the Federal Circuit recognized the confusion:

The Supreme Court has not been clear . . . as to whether such subject matter is excluded from the scope of § 101 because it represents laws of nature, natural phenomena, or abstract ideas. See Diehr, 450 U.S. at 186 (viewed mathematical algorithm as a law of nature); Gottschalk v. Benson, 409 U.S. 63, 71-72 (1972)

(treated mathematical algorithm as an “idea”). The Supreme Court also has not been clear as to exactly what kind of mathematical subject matter may not be patented. The Supreme Court has used, among others, the terms “mathematical algorithm,” “mathematical formula,” and “mathematical equation” to describe types of mathematical subject matter not entitled to patent protection standing alone. The Supreme Court has not set forth, however, any consistent or clear explanation of what it intended by such terms or how these terms are related, if at all.

Certain mathematical algorithms have been held to be nonstatutory because they represent a mathematical definition of a law of nature or a natural phenomenon. For example, a mathematical algorithm representing the formula  $E = mc^2$  is a “law of nature” — it defines a “fundamental scientific truth” (i.e., the relationship between energy and mass). To comprehend how the law of nature relates to any object, one invariably has to perform certain steps (e.g., multiplying a number representing the mass of an object by the square of a number representing the speed of light). In such a case, a claimed process which consists solely of the steps that one must follow to solve the mathematical representation of  $E = mc^2$  is indistinguishable from the law of nature and would “preempt” the law of nature. A patent cannot be granted on such a process.